Two new species of Sesiini from Ghana, with description of a new genus (Lepidoptera, Sesiidae, Sesiinae, Sesiini)

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Abstract: A new genus, ***Barbasphecia* gen. n.** (type species *B. hephaistos* sp. n.), and two new species of Sesiini from Ghana, West Africa, are described, *Barbasphecia* ***hephaistos* sp. n.** (holotype male) and *B.* ***ares* sp. n.** (holotype female; both holotypes to be deposited in Tyrolean State Museum Ferdinandeum in Innsbruck, Austria). The foodplant of the former is a species of mistletoe (Loranthaceae).

Key words: Afrotropical region, *Barbasphecia hephaistos*, *Barbasphecia ares*, new genus, new species.

Zwei neue Arten der Sesiini aus Ghana, mit Beschreibung einer neuen Gattung (Lepidoptera, Sesiidae, Sesiinae, Sesiini)

Zusammenfassung: Eine neue Gattung, ***Barbasphecia* gen. n.** (Typusart *B. hephaistos* sp. n.), und zwei neue Arten der Sesiini aus Ghana, Westafrika, werden beschrieben, *Barbasphecia* ***hephaistos* sp. n.** (Holotypus Männchen) und *B.* ***ares* sp. n.** (Holotypus Weibchen; beide Holotypen werden ins Tiroler Landesmuseum Ferdinandeum, Innsbruck, Österreich, gelangen). Die Futterpflanze der ersteren ist eine Mistel (Loranthaceae).

Introduction

In September 2007, the junior author visited a forest adjacent to Kakum National Park in central Ghana. While photographing a huge black and red "wasp", he realised that the insect was actually a clearwing moth of the family Sesiidae (Fig. 2). Lateron he located a very similar clearwing species (Fig. 1) in copula twice, once positioned next to a large pupal exuvia protruding from mistletoe (*Loranthus* sp.), apparently the foodplant. One of the ♂♂ unfortunately escaped while trying to photograph them. He initially thought they would be the same species as the former, but after spreading he realised that the pattern on the thorax is different.

Both species proved to be new to science and are described below. They belong to the tribe Sesiini. Despite the close resemblance of the females there are considerable morphological differences in antennae and molecular biology causing serious doubt that both species belong to the same genus. It seems likely that this is a case of remarkable morphological convergence. However, since the male of one species remains unknown and it is not desirable to create a new genus for every new species, both species were placed into one new genus.

Abbreviations and conventions:

ATA Anterior transparent area.

ETA External transparent area.

Fw. Forewing.

HT Holotype.

Hw. Hindwing.

PT Paratype.

PTA Posterior transparent area.

Barbasphecia gen. n.

Type species: *Barbasphecia hephaistos* sp. n. — Gender female.

Derivatio nominis: BARBA (Lat.) = beard, after the long beard-like tuft of 1st palpomere of ♀, combined with the genus name *Sphecia*.

Description. Large-sized clearwing moths; antenna clavate with apical tuft of scales, serrate and ciliate in ♂, smooth [or bipectinate and ciliate] in ♀; 1st palpomere of ♀ with very long, beard-like tuft; fw. in ♂ transparent almost throughout, in ♀ mostly opaque; thorax and abdomen with yellow patches, ventrally partially orange; fw. with R_4 and R_5 stalked; M_3, Cu_1 and Cu_2 arising close together near anal angle of the discal cell; Cu_1 and Cu_2 running parallel and close together (adjoining each other) in ♂, diverging in ♀; hw. with M_2 arising close to costal margin; M_3 and Cu_1 shortly stalked or arising jointly from anal angle of discal cell; A_1 degenerated, A_3 distally degenerated, marked by row of scales to margin; ♂ genitalia with short, quadrangular valve, outer half covered with long bifurcate, inward directed setae; tegumen-uncus complex with distinct gnathos, uncus rounded with 2 ventrolateral rows of long setae; phallus robust with 2 rows of apical spines; ♀ genitalia with sclerotized antrum, short membranous ductus bursae, corpus bursae without signum.

Differential diagnosis. The ♂ of the new genus is morphologically most resembling *Alonina* WALKER, 1856 from West, East and South Africa, and *Melittosesia* BARTSCH, 2009, described from Madagascar. Also the wing venation (Fig. 6) is similar, but Cu_1 and Cu_2 of fw. adjoining each other (in ♂ only). However, genitalia are quite different from the latter, with robust gnathos, remarkably short valve, the outer half covered with long bifurcate setae, phallus with 2 rows of apical spines. And the characteristic beard-like tuft of 1st palpomere in ♀ has never been mentioned in Afrotropical Sesiini (♀♀ of most species being unknown, however).

Barbasphecia hephaistos sp. n. (Figs. 1, 3, 4, 6–9)

Holotype ♂: Ghana, Central Region, Kakum Forest, Abrafo-Gyawale, 5°21′21.17″ N, 1°22′17.70″ W, 127 m, 18.–28. IX. 2007, dissected (FP 09/02), BOLD sample ID BOX-2218 A01, leg. Sz. Sáfián, coll. F. Pühringer (will later be deposited in Tyrolean State Museum Ferdinandeum in Innsbruck, Austria).

Paratypes (in total 2 ♀♀): 2 ♀♀, same location and date as HT, 1 ♀ dissected (FP 09/03), BOLD sample ID CCDB-04642 G10 (1 ♀ collected in copula with HT ♂).

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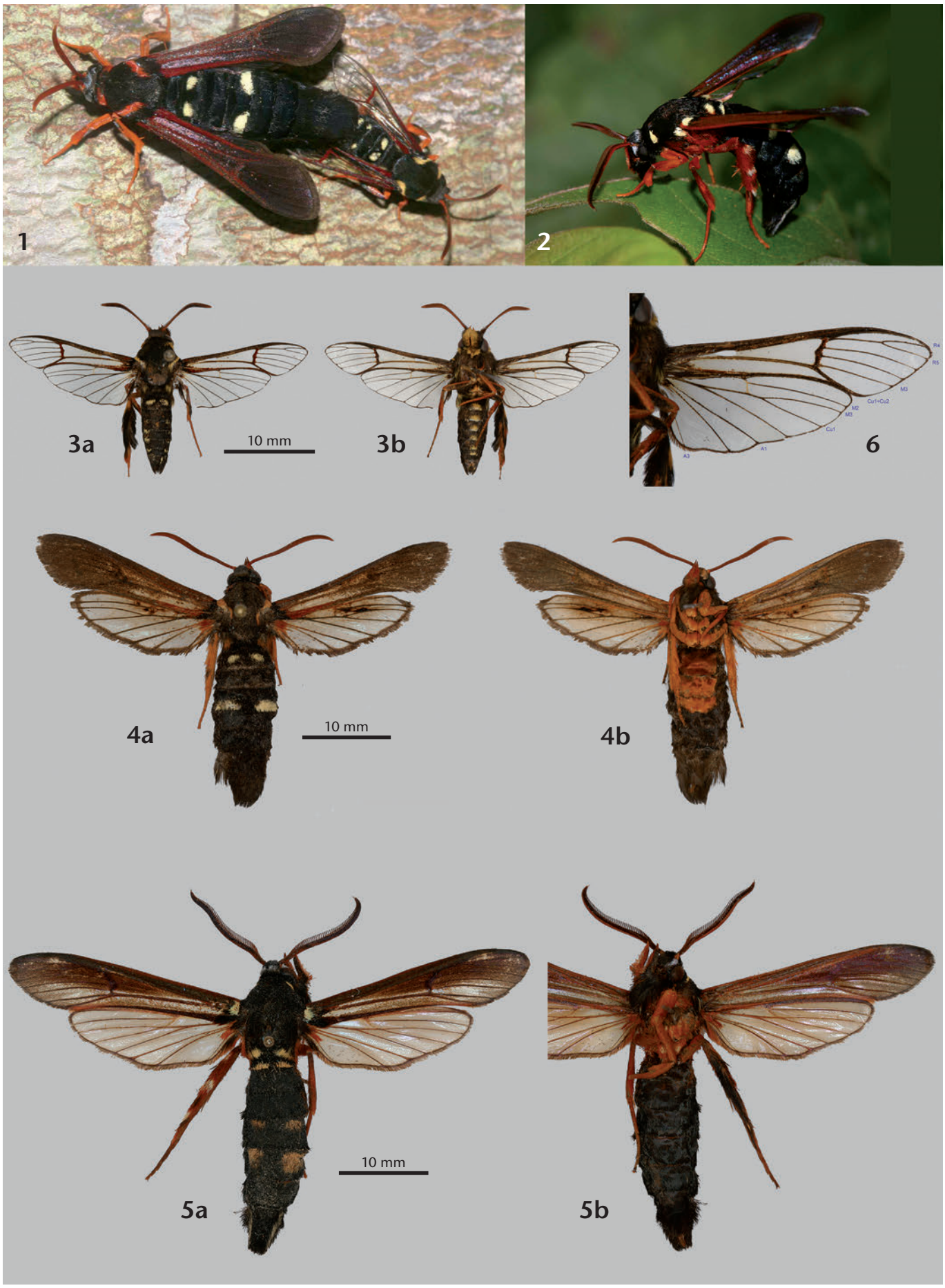

Fig. 1: *Barbasphecia hephaistos* sp. n., HT ♂ and PT ♀ in copula, Ghana, Kakum Forest, Abrafo-Gyawale, 18.–28. IX.2007, leg. Sz. Sáfián. **Fig. 2:** *Barbasphecia ares* sp. n., HT ♀, same data. **Figs. 3a, b:** *Barbasphecia hephaistos* sp. n., HT ♂. **Figs. 4a, b:** *Barbasphecia hephaistos* sp. n., PT ♀. — **Figs. 5a, b:** *Barbasphecia ares* sp. n., HT ♀, same data. **Fig. 6:** *Barbasphecia hephaistos* sp. n., HT ♂, wing venation (underside). — Set specimens approximately to the same scale, scale bar: 10 mm.

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Derivatio nominis: After Hephaistos, God of fire in Greek mythology, because of the fiery abdomen underside of the ♀. The name of the strong blacksmith of the gods is a good match for this big species.

Description

Holotype ♂ (Figs. 1, 3). Fw. length 14 mm, wing span 33 mm, body length 16 mm.

Head. Antenna serrate and ciliate, orange-brown, dorsally mixed with black, with apical tuft of scales, scapus orange; frons and vertex greyish brown; labial palpus with 1st and 2nd palpomere hairy, ventrally yellow, laterally blackish brown, dorsally orange mixed with black, 3rd palpomere smooth, orange; proboscis rather well developed.

Thorax. Blackish brown, patagia dorsally brown, laterally yellow, ventrally yellow mixed with brown; tegulae brown with yellow stripe (scapular spot) laterally before fw.; thorax laterally (beneath fw.) with yellow hairs, metathorax laterally with yellow hairlike scales; legs orange (mixed with black), fore coxa as well as femora of 2nd and 3rd leg blackish brown, laterally orange, hind tibia long tufted, blackish brown, laterally yellow proximally and orange distally, hind tarsus partially tufted blackish, distally orange; spurs orange.

Abdomen. Blackish brown; tergites 2 (approximated), 4 (small), and 5–7 laterally with yellow patches at fore margin; sternites 2–7 ventrocaudally bordered yellow. Anal tuft smooth, brown, with yellow scales dorsolaterally (and a few ventrocaudally).

Forewing. Upperside brown, mixed with dark orange scales, black basally; transparent areas very well developed, ETA very large, consisting of 6 cells, ATA missing; discal spot dark orange, interiorly lined blackish; costal and anal margin dark orange medially; fringes very short. Underside brown, with few orange scales.

Hindwing. Hyaline, veins and fringes brown; discal spot missing, just costal margin slightly broadened at discoidal vein; discoidal vein whitish (scales missing); underside like upperside.

Wing venation (Fig. 6). Fw. with R_4 and R_5 stalked; M_3, Cu_1 and Cu_2 arising close together near anal angle of the discal cell; Cu_1 and Cu_2 running parallel and close together (adjoining each other); hw. with M_2 arising close to costal margin; M_3 and Cu_1 shortly stalked; A_1 degenerated (marked by scales), A_3 distally degenerated, marked by row of scales to margin.

Paratype ♀ (Fig. 4). Fw. length 22 mm, wing span 47 mm, body length 27.5 mm (much larger than ♂).

Head. Antenna clavate (without cilia), orange-brown; frons greyish brown, mixed with orange; labial palpus dark orange, smooth, 1st palpomere with very long (beard-like) tuft of brown hairy scales.

Thorax. Blackish brown, patagia dorsally brown, laterally orange; tegulae brown with orange stripe (scapular spot) laterally before fw.; thorax laterally (beneath fw.) with orange hairs, metathorax laterally with orange hairlike scales; legs orange (also coxae and femora), hind tibia rather smooth, orange with 3 black patches laterally (2 proximally, 1 distally), hind tarsus not tufted.

Abdomen. Blackish brown; tergites 2 (in middle) and 4 (at posterior margin) laterally with yellow patches; sternites 1–4 dark orange. Anal tuft brown.

Forewing. Upperside almost opaque, brown, mixed with dark orange scales, black basally; ETA missing, apical area brown; discal spot narrow, dark orange; ATA and PTA partially covered by brown (and orange) scales (especially distally); costal and anal margin dark orange medially; fringes well developed, brown. Underside brown, with few orange scales.

Hindwing. Hyaline, basally orange; veins (also discoidal vein) brown (mixed with light brown scales); discal spot small, orange, extending to M_1; fringes well developed, brown; costal margin light yellowish; underside brown mixed with orange.

Wing venation. Cu_1 and Cu_2 of fw. diverging (not close together).

Otherwise as ♂.

Variability

♀. Fw. length 21–22 mm, wing span 46–47 mm, body length 26.5–27.5 mm.

Frons may be greyish brown throughout; apex of labial palpus may be brownish; scapular spot may be yellowish in middle; sternites 3–4 may be mixed with black (especially anteriorly).

Genital. ♂ (FP 09/02, Fig. 8). Valve quadrangular, remarkably short, outer half covered with long bifurcate, inwardly directed setae; Tegumen-uncus complex with distinct gnathos, uncus rounded with 2 ventrolateral rows of long setae; vinculum narrow with short processes, saccus slender, apically rounded. Phallus robust, with 2 rows of apical spines.

♀ (FP 09/03, Fig. 9). Antrum sclerotized, ductus bursae short, membranous; corpus bursae without signum.

Differential diagnosis

Cannot be confused with any known Sesiidae species of Africa. For differences from *Barbasphecia ares* sp. n., see below.

Habitat and biology

Kakum National Park is located in the Central Region of Ghana along Africa's west coast and lies within the moist evergreen zone of the Upper Guinean rainforests. The 30 hectare private forest habitat at the type locality adjacent to the national park is a mosaic of secondary rainforest, parkland and farmland containing *Citrus* groves. The species was found within an orange grove

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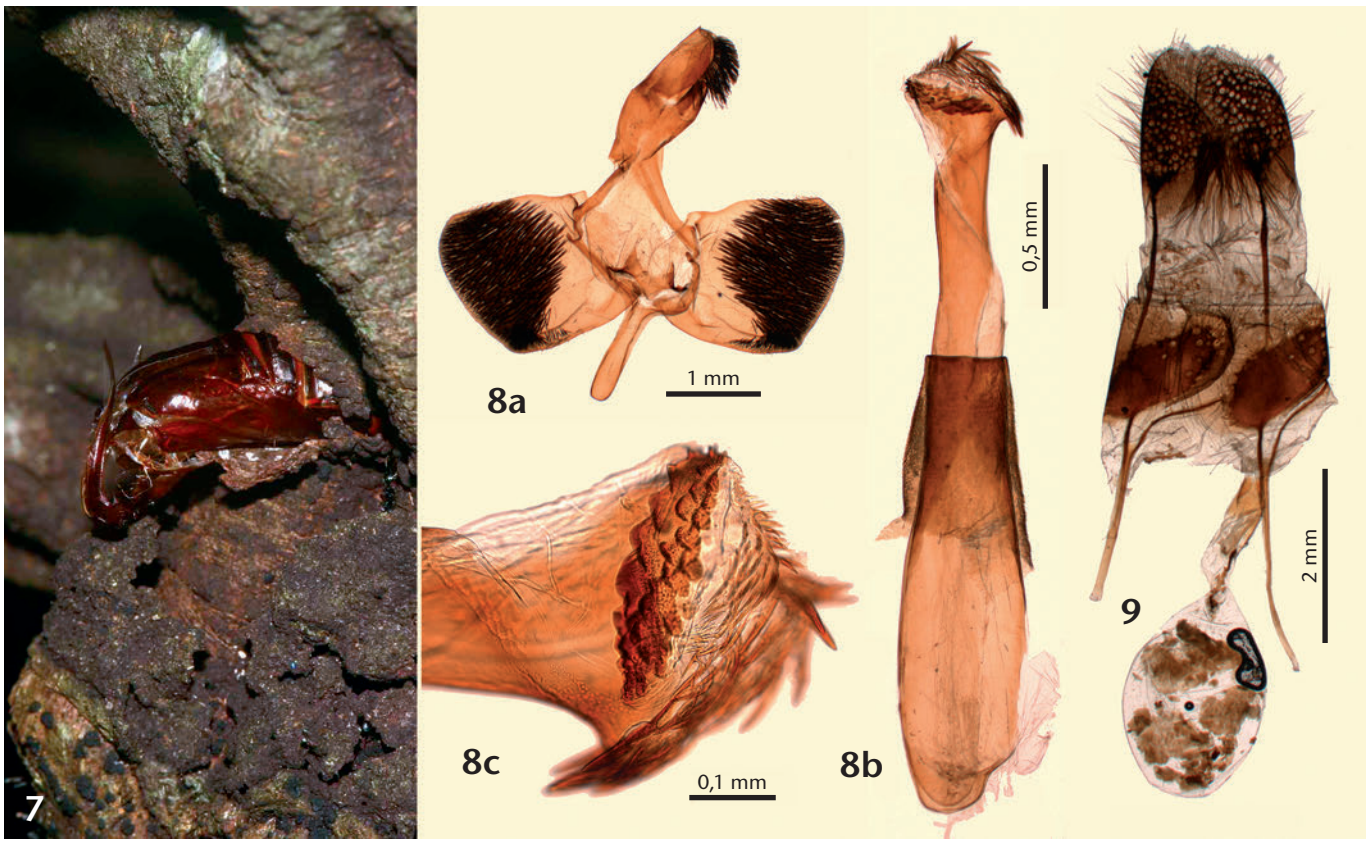

Fig. 7: *Barbasphecia hephaistos* sp. n., exuvia protruding from *Loranthus* sp. **Figs. 8a, b, c:** *Barbasphecia hephaistos* sp. n., HT ♂, genital (**a:** genital. **b:** phallus. **c:** vesica [not everted]). **Fig. 9:** *Barbasphecia hephaistos* sp. n., PT ♀, genital.

where the old *Citrus* trees (Rutaceae) were heavily infested by the parasitic mistletoe plant (Loranthaceae).

Biology: The foodplant is in all probability mistletoe *(Loranthus* sp.), the copula of the species having been found next to a substantial sized Sesiid pupal exuvia protruding from mistletoe growing on cultivated *Citrus* trees in a plantation next to secondary rain forest.

Copulae were found in the morning (about 8 h) sitting on *Loranthus* twigs lying on the ground. Various mistletoe species are well known foodplants for other sesiid species found throughout the world.

Distribution: Known only from the type locality.

Barbasphecia ares sp. n. (Figs. 2, 5)

Holotype ♀: Ghana, Central Region, Kakum Forest, Abrafo-Gyawale, 5°21′21.17″ N, 1°22′17.70″W, 127 m, 18.–28. IX. 2007, BOLD sample ID BOX-2218 A04, leg. Sz. Sáfián, coll. F. Pühringer (will later be deposited in Tyrolean State Museum Ferdinandeum in Innsbruck, Austria).

Derivatio nominis: After Ares, God of war in Greek mythology, brother of Hephaistos, because of the close resemblance to *Barbasphecia hephaistos* sp. n.

Description

Holotype ♀ (Figs. 2, 5). Fw. length 26 mm, wingspan 57 mm, body length 32 mm.

Head. Antenna bipectinate and ciliate, dorsally orange-brown mixed with black distally, ventrally orange, with apical tuft of scales, scapus orange; frons greyish brown, white before eyes; vertex brown with white hair-like scales; pericephalic hairs dark brown; 1st and 2nd palpomere of labial palpus hairy, ventrally orange mixed with white, dorsally brown, 1st palpomere with very long (beard-like) tuft of brown hairy scales, 3rd palpomere smooth, orange.

Thorax. Blackish brown, patagia dorsally brown, laterocaudally yellow; tegulae brown; thorax laterally (beneath fw.) yellow, metathorax laterocaudally with yellow (and orange) hairlike scales; legs orange, hind tibia hairy, mixed with black, laterally orange with pale yellow patches (proximally, middle and distally), hind tarsus proximally hairy, orange mixed with black; spurs orange.

Abdomen. Blackish brown; tergite 1 with yellow patches laterally at hind margin (approximated), tergites 4 (small) and 5 with yellow patches laterally at fore margin; sternites 1–2 with few orange scales. Anal tuft dark brown, with pale yellow stripes laterally.

Forewing. Upperside almost opaque, brown, at veins mixed with dark orange scales, yellow basally; ETA merely indicated from M_2–Cu_1, apical area brown; discal spot inconspicuous, somewhat darker brown; ATA and PTA small, poorly defined; costal and anal margin dark orange, anal margin black basally; fringes brown. Underside brown and orange.

Hindwing. Hyaline, basally orange; veins brown (mixed with light brown scales); discal spot small, light brown, extending to M_1; fringes brown; costal margin light yellowish (if visible); underside mostly orange.

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Wing venation. M_3 and Cu_1 of hw. originating from (one point of) anal angle of discal cell (not stalked), otherwise as in *B. hephaistos*.

Genital. The only known specimen has not been dissected because of lack of characteristic details in ♀ genitalia of the group.

♂ unknown.

Variability unknown.

Differential diagnosis

The ♀ of *Barbasphecia ares* sp. n. can easily be distinguished from *B. hephaistos* sp. n. by the following characters: antenna bipectinate (filiform in *hephaistos*), scapular spot missing (orange-yellow in *hephaistos*), base of fw. yellow (black in *hephaistos*), patagia yellow laterally (orange in *hephaistos*), tergites 1, 4, 5 (2, 4 in *hephaistos*) with yellow patches laterally.

Habitat and biology

As above, but the type specimen was collected along the edge of a 40–50 years old secondary forest.

Biology: The foodplant is unknown.

Distribution: Known only from the type locality.

Molecular biology

In the course of the Barcoding of Life project (Ratnasingham & Hebert 2007) 2 sequences (658 bp and 307 bp, respectively, differing only in 1 of 307 bp [= 0,3 %]) of the mitochondrial cytochrome-*c* oxidase I (COI) gene of *Barbasphecia hephaistos* sp. n. and 1 sequence (658 bp) of *B. ares* sp. n. have been generated (BOLD sample IDs see above). According to these sequences, *B. hephaistos* sp. n. would be next to *Melittosesia*, and *B. ares* sp. n. next to *Sesia* (Fabricius 1775). However, many genera of African Sesiini have not yet been investigated. The 2 species differ within the barcode sequence by 12.8 %(!). Phylogenetic and molecular evolutionary analyses were conducted using *MEGA* version 4 (Tamura et al. 2007).

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Personalia

Nachträge zur Bibliographie von Claude Lemaire

Nachdem wir 2004 einen Nekrolog mit Bibliographie, Neubeschreibungsverzeichnis und Patronymliste veröffentlichten (Naumann et al. 2004), sind inzwischen postum noch zwei weitere Arbeiten (darunter sogar eine mit Claude Lemaires Koautorenschaft – Publikationsdatum auch 2004 –, von der wir allerdings erst im Sommer 2006 Kenntnis erhielten) erschienen, die wir hier nachtragen möchten. Auch zwei andere Nekrologe (Vives Moreno 2004 und Minet & Thiaucourt 2005) können wir noch nachmelden, die bis auf einige persönliche Angaben im Text mit unserer Bibliografie und Patronymliste weitgehend deckungsgleich sind; Minet & Thiaucourt (2005) allerdings haben noch zwei von uns übersehene Arbeiten mit Claude Lemaire als Koautor aufgeführt, die wir im nächsten Absatz mit aufführen.

Arbeiten mit C. Lemaire als Koautor (chronologisch)

Lemaire, C., & Tangerini, N. (1978): Description du néallotype femelle et répartition géographique de *Paradaemonia samba* (Schaus) [Lép. Attacidae Arsenurinae]. – Bulletin de la Société entomologique de France, Paris, **82** (5–6): 133–138.

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